

A SCREEN FOR SPECTACLES, AND PIECES FOR FORMING SUCH A
SCREEN

FIELD OF THE INVENTION

The present invention relates to removable screens
5 for spectacles, to hook-shaped pieces for fastening a
screen to spectacles, and to a lens-assembly piece for
forming a removable binocular screen for spectacles.

The technical field of the invention is the field of
manufacturing spectacles.

10 The invention applies particularly to devices for
fastening a monocular or binocular screen or lens to a
pair of spectacles, such a device comprising a deformable
or resilient stud or pin which is designed to extend
through a channel or a through orifice provided in the
15 screen or lens to be fastened, and further comprising a
fastening clip suitable for fitting over the edge of a
spectacles lens or of a spectacles frame.

BACKGROUND OF THE INVENTION

Patent Application WO 97/19384 describes various
20 embodiments of such a stud, and various embodiments of
such a fastening clip; that document also describes a
binocular screen provided with an elongate curved piece
which serves to assemble together two screens to form a
binocular screen; a fastening clip is integral with or
25 secured to each end of that piece; in certain
embodiments, the fastening clip has two tabs provided
with respective through orifices; the tabs and the
orifices face each other.

Fastening each fastening clip to the screen by means
30 of a stud is difficult because of the small dimensions of
those pieces; that drawback is greatly reduced when the
stud and the clip form a single piece.

Document WO 98/39681 describes a hook for fastening
a screen to spectacles. That hook comprises such a stud
35 or pin and such a fastening clip or hoop, and remedies
that drawback.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide such a hook that is improved still further.

Another object of the invention is to provide a
5 binocular screen for spectacles that is improved, and a kit specially designed to enable an optician to make, individually and to order, a monocular or a binocular screen of shape and of dimensions matching the shape and dimensions of a determined pair of spectacles.

10 An object of the invention is also to remedy, at least in part, the drawbacks of known screen-fastening pieces and of known additional screens.

In a first aspect of the invention, the invention provides a fastener or fastener piece for releasably
15 fastening a screen to spectacles made up of lenses and of a frame, the screen being provided with through orifices; the fastener has a pin suitable for extending through a respective orifice in the screen, and a portion or clasp secured to or integral with the pin and suitable for
20 fitting over the edge of one of the lenses and/or of the frame; the fastener also has one or more bearing portions, preferably one or more bearing face portions, and in particular one or more bearing faces, suitable for sliding over the edge of a lens and/or of the frame of
25 the spectacles so as to enable the screen to be secured to the spectacles, by means of the fastener - in particular said portion or clasp - being deformed substantially resiliently, without requiring the fastener to be manipulated directly by the user - using the hand
30 or the fingers - to cause such deformation; the invention makes it possible to engage the clasp over the periphery of the lens and/or of the frame, by moving and pushing the screen towards the lens of the spectacles, until the lens or the frame is engaged in the groove or notch in
35 the fastener.

A screen equipped with such fasteners is easier to secure to a pair of spectacles than the fasteners

described in WO 98/39681; preferably, a monocular screen of the invention has three fasteners fastened to the periphery of the screen: two fasteners are disposed along the top edge of the screen so that they can be engaged in the vicinities of the bridge and of one of the end-pieces of a pair of spectacles, while a third fastener is disposed along the bottom edge of the screen, preferably off-center, in the vicinity of the respective side arm or "temple" of the pair of spectacles; with a screen having such a configuration, the notches in the two top fasteners of the screen can be fitted around the edge of the lens or of the frame of the spectacles, with the screen being held slightly inclined relative to the lens; by subsequently pivoting the screen relative to the lens, it is possible to bring the bottom fastener into contact with the bottom portion of the edge of the spectacles lens, via its sliding bearing face; by continuing this pivoting motion, it is possible to cause the sliding bearing face to move across to the other side of the edge of the lens, by means of the bottom fastener being deformed, until the edge of the lens engages in the groove or notch in the bottom fastener (see Figures 5 to 7 in particular).

The configuration of the fasteners of the invention also makes it possible to secure a screen to a lens by placing the screen facing the lens, by disposing the respective sliding bearing faces of the three fasteners in contact with respective ones of three zones of the edge of the lens or of the frame of the spectacles, and then by pushing the screen against the lens so as to move it in translation, until the three notches engage over the edge of the lens or of the frame; these operations can thus be performed with one hand by the wearer of the spectacles.

Said sliding bearing face or face portion may be curved; nevertheless, in a preferred embodiment, it is substantially plane.

In order to make it easier for the fastener to slide against the lens or the frame of the spectacles, said sliding bearing face or face portion is preferably inclined relative to the longitudinal axis of the pin, at an angle lying in the range 15° to 75° , preferably in the range 30° to 60° , and in particular approximately in the range 40° to 50° . Naturally, when the bearing face is curved, said angle may vary from one portion of said face to another.

10 The clasp-shaped portion of the fastener, which serves to fit over the edge of the lens or of the spectacles frame, is provided with a groove or notch of width adapted to match the thickness of the lens or of the frame; said width generally lies approximately in the
15 range 1 millimeter (mm) to 5 mm.

In another aspect of the invention, the invention provides a fastener for fastening a screen to spectacles, the fastener having a U-shaped portion or clasp suitable for fitting over the edge of the lens and/or of the frame
20 of the spectacles, said portion or clasp defining a groove or notch having an end wall and an opening; in order to hold the screen more securely in position on the spectacles, the width of the opening is narrowed, i.e. it is smaller than the maximum width of the groove or notch.

25 In a preferred embodiment, the groove or notch is defined by a plane first face situated in the vicinity of the pin, by a plane second face forming the end-wall of the groove and serving to cover a portion of the lens edge or of the frame edge, and by a third face situated
30 in the vicinity of the inclined sliding bearing face; the first and second faces are substantially perpendicular, while the third face, which may be plane or curved, is inclined relative to the first face so as to co-operate with the first and second faces to define a groove or a
35 notch that flares towards its end wall and/or tapers towards a narrowed opening.

In another aspect of the invention, the invention provides a fastener piece for releasably fastening an optical screen to a pair of spectacles, which fastener piece has a pin suitable for extending through a through orifice in the periphery of the screen, a deformable elongate central portion, and a tapering projection that is in the form of a tooth or a barb and that extends at the free end of the deformable elongate central portion; preferably, said projection is defined in part firstly by said sliding bearing face and secondly by said third face of the groove or notch; the central portion is thus suitable for fitting over the edge of the lens.

In another aspect of the invention, the invention provides a fastener for fastening a screen to spectacles, which fastener has a pin provided with three abutments: namely a first abutment suitable for extending in contact with a rear face of a screen, a second abutment suitable for extending in contact with a front face of a screen, and a third abutment suitable for extending in contact with a portion of a coupling piece for coupling together two monocular screens of a binocular screen.

In another aspect of the invention, the invention provides a coupling piece for coupling together two monocular screens for the purpose of forming a binocular screen that is adapted to fit a pair of spectacles; the coupling piece has an elongate central portion extending along a longitudinal axis, and two preferably-identical clasps provided at - and in particular incorporated with - respective ones of the longitudinal ends of the elongate central portion; each clasp has two tabs facing each other, and substantially parallel to each other, each of which is provided with a through orifice for receiving a pin of a fastener of a screen; the coupling piece is symmetrical about a front-to-back midplane, and the normal to the plane of each tab is inclined relative to the plane of symmetry of the coupling piece; this makes it possible to couple together two monocular

screens having a certain amount of curvature, while holding their respective optical axes substantially parallel to each other.

In another aspect of the invention, the invention provides a coupling piece for coupling together two
5 monocular screens, which coupling piece has an elongate central portion extending along a longitudinal axis, and two clasps provided at respective ones of the longitudinal ends of the elongate central portion; each
10 clasp has two tabs facing each other and substantially parallel to each other, each of which is provided with a through orifice for receiving a pin of a fastener of a screen; a first tab of each clasp is provided with a first through orifice having a first diameter, and a
15 second tab of each clasp is provided with a second through orifice having a second diameter that is larger than the first diameter; each clasp has its first orifice substantially aligned with its second orifice; thus, a first pin portion having a first size can extend through
20 the first orifice, while a pin portion having a second size, greater than the first size, can extend through the second orifice; this makes it easier to secure a screen reliably to the clasp of the coupling piece, via a fastener having a cylindrical pin having a plurality of
25 (in particular two) projecting abutments that are mutually adjacent along the pin.

Preferably, the hooks or fasteners of the invention are obtained, directly or otherwise, by injecting a plastics material into a multi-cavity mold, in order to a
30 form a cluster of fasteners, while the coupling piece is obtained, directly or otherwise, by cutting out, drilling and folding a sheet of metal. In one embodiment, the coupling piece for coupling together two screens is obtained from a sheet of steel having a thickness less
35 than or equal to 5×10^{-4} meters and generally not less than 10^{-4} meters; this makes it possible to obtain a binocular screen that is robust, light in weight, and

attractive in appearance, and makes it possible, in particular by means of its resilience, to use a single coupling piece for forming binocular screens of shapes and of dimensions that match a plurality of different
5 models of spectacles frame.

Advantageously, said coupling piece is made of a semi-rigid synthetic or metal material having a certain amount of resilience, imparting a shape memory to it.

Preferably, said coupling piece is made of a noble
10 metal that has a shape memory, such as beta titanium.

The resilience of the coupling piece and the shape memory property make it easier to put the binocular screen in place and to return the binocular screen to its original shape if it is deformed in any way while it is
15 being handled for the purpose of fitting it to or removing it from the spectacles frame.

In other aspects of the invention, the invention provides removable optical screens for spectacles, which screens incorporate such fasteners or fastening hooks,
20 the invention provides such coupling pieces for coupling together two monocular screens, and the invention also provides kits of pieces for forming such screens; the invention is particularly applicable to forming filtering screens.

25 BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages and characteristics of the invention will be understood on reading the following description given with reference to the accompanying drawings, and illustrating preferred embodiments of the
30 invention by way of non-limiting example. In the drawings:

Figure 1 is a diagrammatic perspective view of a pair of spectacles and of a binocular screen of shape and dimensions matching the pair of spectacles, said screen
35 being shown in front of the lenses of the pair of spectacles;

Figure 2 is a side view of a hook for fastening a screen to spectacles, in a first preferred embodiment of the invention;

5 Figure 3 diagrammatically shows a side view of a screen whose top and bottom are equipped with respective fastening hooks similar to the hook shown in Figure 2;

Figure 4 shows the screen of Figure 3, and a lens of a pair of spectacles, in a position in which the screen is being clipped by its top fastener onto the top end of the lens, before the bottom fastener secured to the
10 screen is engaged with the edge of the lens of the spectacles;

Figures 5 to 7 are diagrammatic side views showing respective ones of three successive steps in engaging a screen fastener onto a spectacles lens: in the
15 configuration shown in Figure 5, the screen-fastening hook bears via its bearing face against the edge of the lens; in the configuration shown in Figure 6, the tooth of the screen fastener is substantially in contact with the middle portion of the edge of the lens; while in the
20 configuration shown in Figure 7, the tooth-shaped portion of the screen fastener has passed across to the other side of the edge of the spectacles lens, and the fastener is clipped around a portion of the edge of said lens;

25 Figures 8 to 11 show a coupling piece for coupling together two monocular screens and serving to assemble together said two screens for the purpose of forming a binocular screen as shown in Figure 1; Figure 8 is a side view of the coupling piece; Figure 9 is a plan view of the piece shown in Figure 8 seen looking in the direction
30 IX of Figure 8; Figure 10 is a plan view of the same piece, before the tabs of the clasp provided at each of the two ends of the coupling piece are folded down; Figure 11 is a side view of one of the clasps provided at
35 both ends of the coupling piece, and it is a view looking in the direction XI of Figure 8;

Figure 12 is a diagrammatic section view of a hook serving to fasten a binocular screen to a spectacles frame; this figure more particularly shows the screen fastener after its tapering end has been cut off, the screen-fastening hook being provided with a pin extending through orifices provided through respective walls of a clasp of a coupling piece, and through the screen to be fixed to the spectacles; and

Figure 13 is a diagrammatic perspective view of an embodiment of a screen fastener similar to the screen fastener shown in the preceding figures.

MORE DETAILED DESCRIPTION

With reference to Figure 1, the pair 1 of spectacles comprises two lenses 3 framed by a frame 4, and two temples 2 hinged to the frame 4.

The binocular screen 5 comprises two monocular lenses or screens 6 which are coupled together by a coupling piece 7, each screen being provided with three fasteners or hooks 8 serving to secure the removable screen 5 to the frame 4 of the pair 1 of spectacles; as shown in Figure 1, for each screen 6, two fasteners 8 serve to secure the screen to the spectacles only, while one fastener 8 disposed at the top and inner (or nasal) portion of the screen 6 serves also to secure the screen to the end of the coupling piece 7.

As shown in Figures 2 to 7 and 13, in particular, the fastener 8 comprises a pin 9 secured to three portions 10, 11, and 12 forming a clasp defining a groove or notch 16 and serving to fit over the edge of a spectacles lens or of a frame of a pair of spectacles.

The pin 9, which is made of an easily breakable plastics material, is in the form of a cylinder segment 90, 92 extending along a longitudinal axis 98 and having a tapering tip 91 making it easier to insert the pin into an orifice provided through a screen.

The cylindrical portion 90, 92 of the pin is provided with two annular protuberances 94 and 95 that

form two abutments, and with one face 93 forming an interface between the pin 9 and the portion 10 of the clasp, said face 93 also serving as an abutment; the abutments 93 and 94, which are spaced apart by a distance 96 along the axis 98, serve to come into contact respectively with the rear face (referenced 60 in Figure 3) and with the front face (referenced 61 in Figure 3) of a screen; to this end, the distance 96 between them is slightly smaller than the thickness of the screen in the zone through which the orifice extends through which said portion 92 of the pin is to be inserted.

The second annular abutment 95 adjacent to the abutment 94 is removed when the fastener or hook 8 is used to secure the pair of spectacles to a portion of the screen 6 only; said abutment 95 is kept when the fastener or hook 8 is used to secure the spectacles frame 4 both to the screen and to the coupling piece 7 for coupling together two monocular screens, as shown in Figures 1 and 12; to this end, the distance 97 between the abutment 95 and the abutment 93 matches the thickness of the screen 6 plus the thickness of the two tabs of the clasp provided at the end of the coupling piece 7, so that the abutment 95 comes into contact with and bears against the outer face of the clasp, as shown in Figure 12.

The clasp-shaped portion constituted by the three portions 10, 11, and 12 of the fastener 8, which clasp-shaped portion is made of the same easily deformable plastics material (in particular polyurethane) as the pin 9, has a side face 13 that is substantially plane and that is orthogonal to the axis 98, an end-wall face 14 that is also substantially plane and that is parallel to the axis 98, and a curved third face 15, the three faces 13 to 15 defining the groove or notch 16 serving to receive a lens edge portion; the end 12 of said clasp-shaped portion tapers and has a sliding bearing face 17 whose function appears clearly from Figures 5 to 7 which show the operations during which the fastener is

progressively engaged and deformed for the purpose of securing the screen to a spectacles lens; the faces 15 and 17 of the portion 12 of the clasp terminate in the form of a pointed tip 18 serving to come into contact
5 with the rear face of the lens or of the spectacles frame to which the screen is to be fixed by means of said fastener 8.

Figure 3 shows the screen 6 in which two orifices 62 and 63 are provided in the vicinity of the edge of the
10 screen; the pins of the two fasteners 8 shown in the figure have been engaged through respective ones of said orifices until the abutments 94 on the pins come out the other side of the respective orifices, and the unused ends of the pins in front of the abutments 94 have been
15 cut off.

As shown in Figure 4, the top fastener 8 coupled to the screen 6 has been engaged by sliding the notch or groove 16 defined by the fastener around the edge 30 of the spectacles lens, at the top portion of thereof; in
20 order to secure the screen 6 to the lens 3, it is necessary merely to move the screen 6 relative to the lens 3 in the direction indicated by the arrow 99 shown in Figure 4, i.e. substantially pivotally about an axis perpendicular to the plane of the figure and situated
25 approximately at the location referenced 100 in Figure 4 and which corresponds substantially to the center of the notch 16 in the top fastener 8 and/or to a tangent to the edge 30 of the lens 3.

As shown in Figures 5 to 7, the bottom fastener 8 is
30 engaged by placing the tooth-shaped portion 12 of the fastener 8 in contact with the bottom edge 31 of the lens 3, by pushing on the screen 6 in the direction indicated by the arrow 99; as shown in Figure 6, continued pushing 99 causes the portions 11 and 12 of the fastener 8 to
35 deform, and causes the tip 18 of the fastener 8 that interconnects the above-described faces 17 and 15 of the portion 12 of said fastener to pass progressively across

to the other side of the bottom edge 31 of the lens 3, until, as shown in Figure 7, the edge 31 of the lens 3 is engaged in the notch 16 defined by the fastener.

As shown in Figures 8 to 11, the coupling piece 7 for coupling together two monocular screens comprises a blade 71 made of beta titanium and whose thickness 72 is, for example, in the vicinity of 0.3 mm. The blade is curved with a radius of curvature 73 that is, for example, in the vicinity of 30 mm, and said blade is generally symmetrical about a front-to-back midplane 70.

Each end of the blade 71 is provided with a respective clasp 74, 75 which, as shown in particular in Figure 11, comprises three plane wall portions forming a U-shaped clasp as seen from the side: one plane wall 101 extending inclined relative to the end of the blade 71, and two plane wall portions 77 and 78 or tabs extending in planes perpendicular to the plane of the wall 101 of the clasp; each tab 77, 78 is provided with a respective through orifice 103, 104, the dimensions of the two orifices being slightly different, and the two orifices being aligned along a common axis 102 that is inclined relative to the front-to-back midplane 70 of the piece.

The blade 71 extends along a longitudinal axis 76 while, when the piece is formed (after folding), the tabs 77 and 78 extend parallel to a plane 79 forming an angle 110 with the longitudinal axis 76 of the blade, so as to facilitate obtaining a binocular screen, in which the respective optical axes of the two monocular screens are substantially parallel; the axis 102 of the orifices provided through the tabs 77, 78, which axis is normal to the plane 79 of said tabs, is inclined at the same angle relative to the front-to-back midplane 70 of the piece.

With reference to Figure 12, in the position in which a screen and a clasp of a coupling piece are assembled together by the fastener piece 8 of the invention, the first abutment 94 is deformed and compressed radially inside the orifice provided through

the screen 6, while the second abutment 95 bears against the tab 77 of the clasp of the coupling piece.

As shown in Figure 2, in particular, the sliding bearing face 17 is inclined relative to an axis parallel to the longitudinal axis 98 of the pin 9, at an angle 170 approximately in the range 30° to 60° .